DOCUMENT RESUME

ED 158 494 EC 111 895

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TITLE Qualitative Assessment of Cognitive Skills.
PUB DATE Jun 78
NOTE 16p.; Paper presented at the World Congress on Future Special Education (First, Stirling, Scotland, June 25 - July 1, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Cognitive Development; Criterion Referenced Tests; *Evaluation Methods; *Handicapped Children; Literature Reviews

ABSTRACT

The paper describes the emergence of the variety of modified approaches toward the assessment of cognitive skills. A change in emphasis away from norm-referenced assessment toward criterion-referenced assessment is noted. For such approaches as emphasis on the process rather than the product, intense detailed behavioral observations, and assessment of individual gains, a generic term "qualitative" assessment is suggested to distinguish it from "quantative" assessment. (Author/SBH)

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QUALITATIVE ASSESSMENT OF COGNITIVE SKILLS

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Abstract

Assessment of cognitive skills during the present century has been characterized almost exclusively by the emphasis upon norm-referenced theory. Currently we are noticing a change in emphasis away from norm-referenced assessment toward criterion-referenced assessment. The present paper describes the emergence of the variety of modified approaches toward the assessment of cognitive skills. For such approaches as; emphasis upon the process rather than the product, intense detailed behavioral observations, assessment of individual gains, a generic term "qualitative" assessment is suggested in order to distinguish it from "quantitative" assessment.

Qualitative Assessment of Cognitive Skills[1]

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Interest in cognition, cognitive skills and subsequently their assessment is intrinsically related to cultural and social evolution. Evolutionary emergence of "homo sapiens" was by definition related to the kind of adaptation which required cognitive skills. Hence, since the emergence of the most elementary forms of social organization and throughout the recorded human history cognitive skills were highly valued as necessary for survival. It is possible to say with certainty that in humans cognition and behavior are inseparable phenomena. This observation was recognized in the past by Descartes who formulated his well known dictum: "Cognito ergo sum," (I am aware therefore I exist). Awareness, interest, attention and curiosity were recognized in the past and the present as attributes of cognitive development and human intelligence. At the turn of the present century Binet, whose contributions are well recognized in Psychology and Education, pointed out that a key factor in discovery and recognition is the ability to focus attention. Binet's discussion of attention predated by half a centry our contemporty understanding of orienting reflex and attention theory. It also should be pointed out that close relationship between orienting reflex and cognition has been suggested by Razran (1961) and more recently by Giora (1975) who stated explicitly: "So it is highly significant that there is at least one unconditional reflex which by definition implies mental process, that is cognition. I mean the orienting reflex" (p. 14). Noted contemporary psychologist Guilford (1967) defined

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[1]Paper presented at the First World Congress on Future Special Education, Stirling, Scotland, June 26-31, 1978.

cognition as "awareness, immediate discovery or recognition of information in various forms: comprehension or understanding" (p. 71). Furthermore, cognition has been also viewed by Piaget (1973) as human species-specific mechanism.

Since the 19th century there have been efforts to assess, quantify and measure individual differences in abilities. Such initial attempts (Wundt, Helmholtz, Weber, Fechner) focused essentially upon the phychophysical or physiological properties of the organism. It is to the credit of Binet that he recognized the need to assess cognitive or "mental" abilities. Pioneering work of Binet gave impetus to the development of standardized norm-referenced tests of cognitive skills, known as tests of intelligence. The first half of the present century was characterized by almost exponential explosion of a variety of intelligence tests, especially in the United States. The construction of intelligence tests has been based upon the assumption that there are human characteristics that in some way reflect cognitive factors which are normally distributed, following a Gaussian distribution (Scott, 1978). The assumption of the normal distribution of cognitive abilities, contributed to the fact that in the United States of America the field of cognitive assessment for many years was almost exclusively under the influence of nomothetic theory of test construction. This trend persisted in spite of the fact that some psychologists (e.g. Allport) argued that nomothetic and ideographic methods were overlapping and contributing to one another (Marceil, 1977). However, while the nomothetic theory predominated in the USA it should be pointed out that parallel to the development of standardized norm-referenced instruments suggestions were made of a need to develop "qualitative" assessment of cognitive skills (Rosolymo, 1910). It should be noted that recently there is an increased realization of the importance of individual differences

within the field of cognitive psychology which includes differences between individuals (Underwood, 1975; Ashby, 1976) as well as differences within individuals (Batting, 1975).

This change in emphasis coincided with criticism of standardized testing, especially individual intelligence testings. Today critics of norm-referenced standardized testing are numerous, ranging from parents, teachers, and elementary school principals (Rudman, 1977) to university professors (Kamin, 1976) and publishers of leading scholarly publications (Piel, 1978). Especially adamant in their criticism of intelligence testing are minority groups viewing it as a systematized method of maintaining and perpetuating institutionalized racism. Controversy led to a moratorium on the use of standardized I.Q. tests for special education placement in public schools of New York City, Washington, D.C. and in the State of California.[2] Both in the USA (Scott, 1978) and abroad (Venger, 1974; Voitko & Gilbukh, 1976; in the USSR) scholars emphasized the lack of precise notion of what it is that we intend to measure. Scott (1978) pointed out one of the problems in the measurement of cognitive skills by suggesting that if we had an appropriate description of the development of cognitive process, then a criterion reference would be easier available so that instruments with known edumetric and psychometric dimensions could be developed. Some of our difficulties in the understanding of developmental processes, and by extension cognition, are attributed by Bronfenbrenner (1977) to inadequate methodologies in developmental psychology, As stated by him: "Much of contemporary developmental psychology is the science of strange behavior of children in strange

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[2] "A position statement on non-biased assessment of culturally different children." Region 9, Task Group on Non-biased assessment. November, 1976. North East Regional Resource Center.

situations, with strange adults for the briefest possible period of time" (p. 513).

Venger (1974) criticized standardized intelligence testing for an attempt to measure without a clear notion of what it is that one is suppose to measure. He strongly suggested that diagnosis of mental development should have qualitative and not quantitative character. Emphasis should be placed upon the assessment of the process of problem solving, rather than the solution itself. For too long such emphasis has been placed upon norm-referenced tests as tools for psychological assessment that testing and psychodiagnosis became synonomous. This practice has been criticized by Voitko and Gilbukh (1976) who pointed out that psychodiagnosis is frequently erroneously associated with the use of psychological tests. They suggested that in reality administration of tests is not an absolute condition for psychological diagnosis. The authors complained that the concept of "psychodiagnosis" was not precisely described by those who introduced it into psychological literature. The term was applied without adequate justification as synonymous with testings, psychometrics, etc. The writers further suggested that objects of psychodiagnostic evaluation are continuous psychological phenomena which like other anthropometric variables do not possess equal units of measurement and do not have clear demarcation between normal and subnormal. In addition there are significant individual differences in abilities. Finally, psychodiagnosis in their judgment is related to mutually inclusive relationships among various phenomena of psychological, psycho-educational, socio-educational and neuro-psychological nature.

In the field of educational measurement criticism of standardized norm-referenced tests has been voiced by Buros (1977) who claims that: "standardized tests are poorly constructed of questionable and unknown validity,

pretentious in their claims, and likely to be misused more often than not" (p. 9). The same authority expressed strong criticism of norm-referenced testings: "Testing specialists claim that scores are only meaningful when compared with scores of other examinees. Unfortunately, authors, publishers and test users, except in the case of criterion referenced tests have accepted this view as axiomatic" (p. 12). Likewise, Vellutino (1977) suggested that there is no foundation for many assumptions underlying assessment practices which pervade the field of learning disabilities.

Some writers expressed caution against premature quantification of data (Dembo, Leviton & Wright, 1975). In their judgment premature quantification is the process which takes place before the task of qualitative description of problems and concepts is sufficiently advanced. The authors also expressed the notion that qualitative analysis of data may contribute considerably more to the understanding of important problems.

As is apparent from the literature which discusses cognitive assessment practices, there is currently almost general consensus that traditional quantitative approach based upon nomothetic theory is being seriously questioned. Consequently we are witnessing the emergence of a variety of modified approaches toward assessment of cognitive skills. Some are focusing more upon process than the product of cognitive abilities, others are emphasizing intense detailed behavioral observations, still others are designed to assess gain or growth of individuals. For such approaches I would like to suggest a generic term "qualitative assessment" as to distinguish them from quantitative assessment. It certainly does not mean that all quantitative norm-referenced tests are inherently lacking in quality. The generic term "qualitative assessment" is suggested in order to sharpen the distinction of new approaches from traditional assessment techniques based upon norm-

referenced tests.

As examples of tasks which focus upon cognitive process and not just its product one might list those developed by Bogoiavlenskays (1971) and Siniov (1973). Bogoiavlenskaya criticized existing tests of intelligence because, in her judgment, they place the examinee in such a situation which requires only activity needed to "solve" a problem. She developed a task to assess creativity involved in the process of problem solving using a modified chess-board. Among those who were able to solve problems successfully, she identified three qualitatively different levels of activities: reproductive, heuristic, and creative.

Siniov reported a study designed to assess inductive and deductive reasoning in students of an auxiliary school. As part of the process the examinee was asked to observe while liquids and objects were heated. The examinee was then asked the following question: "What conclusion can you reach on the basis of what you have just seen"? According to children's responses, cognitive abilities at four levels were identified: a) ability to describe (but not to explain) observed phenomena, b) ability to explain some isolated phenomena, c) ability to express partial generalizations, e.g. "hard objects expand when heated," d) ability to derive the general rule.

More than ten years ago Brison (1967) complained that the systematic direct observations have been largely neglected by educators and researchers. Several possible reasons were suggested for such neglect among them: "a) premature extrapolation of basic psychological research. The extrapolation can be premature either because the necessary developmental research has been neglected or because the investigation does not take into account the difference between laboratory condition and "real life," b) unwarranted application of purely empirical results which have no generalization because

they do not elucidate causal factors that operate in the situations" (p. 111).

Recently various observational techniques were reported both in the USA (Sackett, 1978) and abroad which are being utilized for the purpose of the assessment of cognitive skills and behavioral problems. Sitko, Fink and Gillespie (1977) advocated utilization of systematic observations for decision-making in school psychology. They support their rationale by the argument that the number of presently used norm-referenced instruments is limited as well as based on poorly researched theories of learning and behavioral disorders.

Umanskaya (1977) reported on techniques of cognitive assessment of pre-school children based upon detailed observation during a play situation. The sequence of assessment consisted of: a) game activities, b) classification of objects according to size, color, form, class, and activities. The examiner paid attention to children's spontaneous selection of toys, their use, organization and sequence of the game, consistency of interest, fantasy, verbal comment, and reason for termination of the games. Urbanska (1971) provided an interesting description of assessment and observational practices as part of school psychologists evaluation in Poland. Structural classroom observation is considered a part of the evaluation process and usually lasts one school year. It should also be stressed that the child is not only observed passively in order to determine his current level of cognitive and educational functioning. Throughout the year various methods of instruction are tried with continuous feedback given to the teacher and the child. A detailed anecdotal record of the child's activities is maintained. The record usually contains the following information: a) a description of physical, sensory and behavioral characteristics, b) history of development, pre-school and educational adjustment, c) the role of parents and the extent

of their cooperation with school authorities, d) the child's behavior in the classroom.

Among detailed observation techniques developed recently, the Multiple Disabilities Project at Syracuse University (Curtis & Donlon, 1970) as well as Ecological Assessment of Child Problem Behavior (Wahler, House & Stambaugh, 1976) should also be mentioned.

In addition to intense detailed observations interest in qualitative assessment manifests itself in the development of criterion referenced testing in education (Proger & Mann, 1973) mastery testing (Smith, 1977) and development of various other techniques focusing upon individual gain or growth (Luria, 1966; Carver, 1974; Uzgiris & Hunt, 1975). It has been pointed out by Proger and Mann (1973) that while the norm-referenced assessment evaluates a child's performance in relationship to other children, criterion-referenced measure uses absolute scores of mastery rather than interpretation relative to the mean performance of the group. The authors caution, however, that CRI is a method of test interpretation rather than a type of testing. In the field of education criterion-referenced approach is utilized in mastery testing (Smith, 1977), individually prescribed instruction (Glaser, 1971; Duda, 1970), comprehensive achievement monitoring (Gorth & Grayson, 1969; Allen, 1970), and precision teaching (Kunzelman, 1970; Lindsley, 1971).

Techniques focusing upon individual gain of growth have been incorporated into cognitive assessment practices in the Soviet Union (Luria, 1966; Dubrovina, 1970; Lm, 1974). Dubrovina describes evaluation of cognitive abilities in young school children through the use of numerical and verbal concepts. For example a child will be asked to use numbers 2, 4, and 6 in as many arithmetical combinations as possible. Or a child may be given

three or more words, for example "a girl," "a tree," "a bird" and asked to construct a sentence using given words. The child's performance enabled the examiner to determine individual differences in problem solving process. Some children were unable to solve the problem even with the help of the examiner. Others needed concrete examples in setting up the problem. Some were able to set up the problem but with delay, while a few were able to respond without delay and without help. Em (1974) described a psycho-educational evaluation procedure which consists of comprehensive and written stories and description of series of pictures. Psychological assessment also included classification of pictures, comprehension of similarities and differences and performance on the Seguin Formboard. Educational assessment included observation of child's behavior in the classroom and on the playground.

In the United States, concern for the assessment of individual gain has been noted by Haeussermann (1958), Carver (1974), Urgiris and Hunt (1975) to mention just a few. Carver (1974) suggested that the distinction should be made between traditional psychometric tests that measure differences between individuals and those designed to measure gain and growth of individuals which he labeled edumetric. Earlier, Haeussermann (1958) developed a series of procedures described by her as "structured interviews." The purpose of the interview, which consists of materials and methods selected from various tasks, is to "test the limits" of the child's ability to function. Uzgiris and Hunt (1975) suggested the use of ordinal scales as a novel approach to the assessment of psychological development in infancy. The authors maintain that:

> The ordinal scales imply a hierarchical relationship between achievement at different levels, so that in principle the

> achievements at the higher level do not incidentally follow but are intrinsicly derived from those at the preceeding level and encompass them within the higher level. (p. 11)

Current literature suggests serious reassessment of past practices in the realm of the measurement of cognitive skills. Significant problems were recognized with norm-referenced approach and with quantification of responses leading to the criticism that cognitive tests became achievement tests. On the other hand any attempt to "measure" cognitive skills leads in the direction of their quantification. In the meantime, resolution of this apparent paradox will require more imaginative research. Some of the issues to be resolved relate to the nature of the relationship between maturation, learning and training; the relationship between cognitive levels and direct training; qualitative differences between cognitive skills and teaching strategies. In the long run issues and problems in special education can only be viewed in the context of past practices, current needs and future discoveries. It is not too much to expect that special education soon will become "special" not only because of the population it serves but also because of the methods, strategies and skills it uses.

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